

WHAT IS CLAIMED:

1. A device for relieving pain associated with the vertebrae of the cervical spine and surrounding tissues and structures, by maintaining and/or adding distraction between adjacent cervical vertebrae when positioned between the spinous processes of adjacent cervical vertebrae, without detracting from the rotation of the cervical vertebrae relative to each other, the implant comprising:

1. a wedge-shaped spacer;
2. a wedge-shaped wing; and
3. a wedge-shaped distraction guide.

2. The implant of claim 1 wherein the spacer has smooth, flat surfaces and smooth, rounded edges to create a wedge for varying distraction of adjacent cervical vertebrae.

3. The implant of claim 1 wherein the cross-sectional shape of the wing has smooth, flat surfaces and smooth, rounded edges to create a wedge for varying distraction of adjacent cervical vertebrae.

4. The implant of claim 1 wherein the wing is continuous with the spacer.

5. The implant of claim 1 wherein the distraction guide is continuous with the spacer.

- 1 6. The implant of claim 1 wherein the spacer is rotatable.
- 1 7. The implant of claim 1 including a second wing.
- 1 8. The implant of claim 1 wherein the spacer can rotate relative to the wing and the distraction guide.
- 1 9. The implant of claim 1 wherein the first wing is provided at an obtuse angle to the spacer
- 1 10. The implant of claim 1 wherein the first wing has a posterior end and an anterior end, and the
2 posterior end does not extend as far beyond the posterior end of the spacer as the anterior end extends
3 anteriorly to the anterior end of the spacer.
- 1 11. A device for relieving pain associated with the vertebrae of the cervical spine and surrounding
2 tissues and structures, by maintaining and/or adding distraction between adjacent cervical vertebrae when
3 positioned between the spinous processes of adjacent cervical vertebrae, without detracting from the
4 rotation of the cervical vertebrae relative to each other, the implant comprising:
- 5 1. a wedge-shaped distraction guide;
- 6 2. a wedge-shaped spacer associated with the wedge-shaped distraction guide, which
7 spacer, when urged between the spinous process of the adjacent cervical vertebrae,

8 allows flexion but not extension of the neck and creates a contact surface with the bone
9 of the spinous processes that increases as the wedge-like spacer moves anteriorly,
10 whereby the implant distributes the distraction forces on the spinous processes over the
11 contact surface; and

12 3. a wedge-like wing extending from and continuous with one end of the spacer to
13 maintain lateral placement of the spacer.

1 12. The implant of claim 11 wherein the spacer is rotatable.

1 13. The implant of claim 11 wherein the spacer is rotatable relative to said wing.

1 14. The implant of claim 11 wherein the first wing is provided at an obtuse angle to the spacer.

1 15. The implant of claim 11 wherein the spacer can rotate relative to the wing and the distraction guide.

1 16. The implant of claim 11 wherein the first wing has a posterior end and an anterior end, and the
2 posterior end does not extend as far beyond the posterior end of the spacer as the anterior end extends
3 anteriorly to the anterior end of the spacer.

1 17. The implant of claim 11 wherein the cross-sectional shape of the spacer is selected from the group

2 consisting of tear-drop, wedge, ellipse, and oval.

1 18. An implant for relieving pain associated with adjacent cervical vertebrae of the spine, that have a
2 range of rotation relative to each other in a scissor-like motion, which implant is positionable between the
3 spinous processes of adjacent cervical vertebrae, the implant comprising:

- 4 1. a wedge-shaped spacer;
5 2. a wedge-shaped first wing connected with the spacer;
6 3. a wedge-shaped distraction guide, the distraction guide extending from the spacer at the
7 end distal to the first wing; and
8 4. a wedge-shaped second wing that connects with the spacer.

1 19. The implant in claim 18 wherein the spacer has a cross-sectional shape selected from the group
2 consisting of tear-drop, wedge, ellipse, and oval.

1 20. The implant of claim 18 wherein the first wing has a posterior end and an anterior end, and the
2 posterior end does not extend as far beyond the posterior end of the spacer as the anterior end extends
3 anteriorly to the anterior end of the spacer.

1 21. The implant of claim 18 wherein the spacer is rotatable.

1 22. The implant of claim 18 wherein the second wing has a tongue extending therefrom for use in
2 securing the second wing to the spacer.

1 23. The implant of claim 22 wherein portions of the tongue extending from the second wing define a
2 bore;

3 wherein the spacer has a bore compatible with the bore through the tongue; and
4 a fastener compatible with the bore of the spacer and the bore through the tongue and that can
5 secure the second wing to the spacer.

1 24. The implant in claim 23 wherein the second wing has an anterior side and a posterior side.

1 25. The implant in claim 18 wherein the posterior side of the first wing and the posterior side of the
2 second wing extend no further than the posterior side of the spacer in a posterior direction.

1 26. The implant in claim 13 wherein the first wing and the second wing have an anterior side and a
2 posterior side, and the anterior side of the first wing and of the second wing are angled outward relative
3 to each other to accommodate the anatomy of the adjacent spinous processes of the cervical spine.

1 27. The implant of claim 18 wherein the spacer has an indentation and the second wing includes an
2 exterior that can made with the indentation.

1 28. The implant of claim 18 wherein said second wing has an indentation and the spacer has an
2 extension that can mate with the indentation of the second wing.

1 29. The implant of claim 18 wherein a hole of the second wing allows the second wing to be received
2 over the distraction guide to connect with the spacer toward the end of the spacer adjacent to the
3 distraction guide.

1 30. The implant of claim 18 wherein the hinge has a protrusion at an end of the hinge furthest from the
2 lip.

1 31. The implant of claim 18 including a member for securing the second wing to the spacer when the
2 second wing is received over the distraction guide onto the spacer and adjacent to the distraction guide.

1 32. A device for relieving pain associated with the vertebrae of the cervical spine and surrounding
2 tissues and structures, by maintaining and/or adding distraction between adjacent cervical vertebrae when
3 positioned between the spinous processes of adjacent cervical vertebrae, without detracting from the
4 rotation of the cervical vertebrae relative to each other, the implant comprising:

- 5 1. a wedge-shaped spacer;
6 2. a bore in the spacer;

3. a wedge-shaped first wing attached at one end of a longitudinal axis of the spacer;
4. a wedge-shaped distraction guide at the end of the longitudinal axis of the spacer distal to the first wing;
5. a wedge-shaped second wing that is separate from the spacer, distraction guide, and first wing, and is received over the distraction guide and attached to the spacer during surgery after the distraction guide, spacer, and first wing are positioned;
6. a tongue extending from the second wing;
7. a bore through the tongue of the second wing; and
8. a fastener to join and hold the second wing to the spacer once the second wing is received over the distraction guide and the bore of the tongue of the second wing and the bore of the spacer are aligned.

33. The implant of claim 32 wherein the spacer is rotatably connected with the first wing, the second wing, and the distraction guide.

34. An implant for relieving pain associated with the vertebrae of the cervical spine and surrounding tissues and structures, by maintaining and/or adding distraction between adjacent cervical vertebrae when positioned between the spinous processes of adjacent cervical vertebrae, without detracting from rotation of the cervical vertebrae relative to each other, the implant comprising:

1. a wedge-shaped spacer;

2. a wedge-shaped first wing extending from one end of the longitudinal axis of the spacer;
3. a wedge-shaped distraction guide extending from the end of the longitudinal axis of the spacer distal to the first wing;
4. a wedge-shaped second wing separate from the spacer, distraction guide, and first wing that is attached to the spacer at the end of the longitudinal axis of the spacer distal to the first wing during surgery, after positioning the distraction guide, spacer and first wing; and
5. a system to secure the second wing to the spacer.

35. An implant for relieving pain associated with the vertebrae of the cervical spine and surrounding tissues and structures, by maintaining and/or adding distraction between adjacent cervical vertebrae when positioned between the spinous processes of adjacent cervical vertebrae, without detracting from rotation of the cervical vertebrae relative to each other, the implant comprising:

1. a wedge-shaped spacer with a longitudinal axis, which spacer maintains and/or adds distraction when positioned between the spinous processes of adjacent cervical vertebrae;
2. a wedge-shaped distraction guide at one end of the longitudinal axis of the spacer to introduce distraction between the spinous processes of adjacent cervical vertebrae prior to insertion and positioning of the spacer;
3. a wedge-shaped first wing at the end of the longitudinal axis distal to the distraction guide to maintain lateral positioning of the implant; and

12 4. a keep ring placed around the spinous processes in the way of backward displacement of
13 the implant.

1 36. A method for implanting an implant between the spinous processes of cervical vertebrae comprising
2 the steps of:

3 inserting a first portion of the implant including a spacer and a distraction end laterally;

4 inserting a second portion of the implant including a wing laterally from an opposite direction from
5 the insertion of the first portion; and

6 fastening the second portion to the first portion.

1 37. The method of claim 36 wherein the fastening step includes interference-fitting the second portion
2 onto the first portion.

1 38. The method of claim 36 wherein the fastening step includes applying a fastener to the second and
2 the first portion along a posterior to anterior direction.

1 39. The method of claim 36 wherein the fastening step includes causing a protrusion of one of the first
2 portion and the second portion to mate with an indentation of the other of the first portion and the second
3 portion.

- 1 40. The method of claim 36 including implanting the implant without severing the *ligamentum nuchae*.
- 1 41. The method of claim 36 including implanting the implant without altering the spinous processes.
- 1 42. A device that can relieve pain associated with the spine and the tissues surrounding the spine
2 comprising:
3 a first wing;
4 a spacer;
5 a distraction guide;
6 wherein said spacer is elongated in cross-section and said first wing is elongated in cross-section
7 in the same direction that said spacer is elongated; and
8 said distraction guide extends from said spacer.
- 1 43. The device of claim 42 wherein said first wing and said spacer are wedge-shaped in cross-section.
- 1 44. The device of claim 42 wherein said first wing and said spacer are wedge-shaped in cross-section
2 with the wedge shape of the first wing points in about the same direction as the wedge shape of the spacer.
3
- 4 45. The device of claim 43 including a second wing that is wedge-shaped.

1 46. The device of claim 42 including a second wing having an aperture that is shaped to be received
2 over the distraction guide.

1 47. The device of claim 42 wherein said distraction guide extends from the spacer and the second wing
2 has an aperture that is shaped to be received over the distraction guide and engaged with the spacer.

1 48. The device of claim 42 wherein said first wing is elliptical in shape and the spacer is wedge-shaped.

1 49. The device of claim 48 wherein said second wing is elliptical in shape.

1 50. The device of claim 42 wherein said spacer is rotatable.

1 51. The device of claim 42 wherein said spacer is rotatably mounted relative to the first wing and the
2 distraction guide.

1 52. The device of claim 42 wherein said first wing has an anterior end and a posterior end and the
2 anterior end extends past the spacer and the posterior end ends with the spacer.

1 53. The device of claim 42 wherein said first wing has an anterior end and a posterior end and the
2 anterior end extends past the spacer and the posterior end does not extend past the spacer.

1 54. The device of claim 42 wherein said first wing has an anterior end and a posterior end and the
2 anterior end extends past the spacer and the posterior end is truncated.

1 55. The device of clam 52 including a second wing and the second wing has an anterior end and a
2 posterior end and the anterior end extends past the spacer and the posterior end ends with the spacer.

1 56. The device of claim 53 including a second wing and the second wing has an anterior end and a
2 posterior end and the anterior end extends past the spacer and the posterior end does not extend past the
3 spacer.

1 57. The device of claim 54 including a second wing and the second wing has an anterior end and a
2 posterior end and the anterior end extends past the spacer and the posterior end is truncated.

1 58. The device of claim 42 including a second wing, and wherein said first and second wings diverge
2 from each other.

4 59. The device of claim 42 including a second wing, and wherein said first and second wings are
5 positioned at obtuse angles to the spacer.

1 60. The device of claim 42 including a second wing and wherein said first and second wings have
2 anterior ends that are directed toward an anterior of a patient and wherein said anterior ends diverge from
3 each other.

1 61. The device of claim 42 including a keep that is adapted for being secured to a spinous process in
2 order to block motion of the spacer in a posterior direction.

1 62. The method of claim 36 including implanting the implant without severing the supraspinous ligament.

1 63. The device of claim 42 wherein the first wing is selected from the group consisting of wedge-
2 shaped, elliptical-shaped, tear drop and ovoid-shaped.

1 64. The device of claim 42 including a second wing that can fit over the distraction guide, which is
2 selected from the group consisting of wedge-shaped, elliptical-shaped, tear-drop shaped and ovoid shaped.

1 65. The device of claim 42 wherein said spacer is selected from the group consisting of any wedge-
2 shaped, elliptical-shaped, tear drop shaped and ovoid shaped.